

NATIVE USES OF MARINE MAMMALS ON SANTA CRUZ AND SAN MIGUEL ISLANDS

Roger H. Colten¹ and Jeanne E. Arnold²

¹Peabody Museum of Natural History, Yale University, P.O. Box 208118, New Haven, CT 06520-8118
(203) 432-3774, FAX (203) 432-9816, E-mail: roger.colten@yale.edu

²Department of Anthropology and Institute of Archaeology, Box 951553
University of California, Los Angeles, CA 90095-1553
(310) 206-5801, FAX (310) 206-4723, E-mail: jearnold@ucla.edu

ABSTRACT

California's Northern Channel Islands have supported large populations of marine mammals for several millennia, and the remains of pinnipeds, sea otters, and cetaceans are found in many island archaeological sites. Late Holocene Native American occupants of the islands focused more intensively on fish and shellfish in their diets, however, while marine mammals contributed less to the animal remains in these sites. The Otariidae (fur seals and sea lions) were more abundant than harbor seals and sea otters in all the Santa Cruz Island and San Miguel Island site samples we analyzed. A significant decrease in the abundance of marine mammals in some of these middens correlates with a prehistoric period of warm sea surface temperatures, suggesting an environmental influence for this decline. When compared with other archaeological information, our data indicate no causal relationship between rises and declines in marine mammal hunting and major technological changes or other cultural developments, contrary to some previous suggestions.

Keywords: Otariidae, Phocidae, *Enhydra lutris*, archaeology, culture change.

INTRODUCTION

The Northern Channel Islands were home to some of the largest aggregations of pinnipeds in the eastern Pacific Ocean (Bartholomew 1967; Le Boeuf and Bonnell 1980) and the Native American inhabitants of the Northern Channel Islands hunted marine mammals throughout the 12,500-year occupation of the islands. The relative importance of these animals in Native American society varied seasonally, annually, and over longer spans of time. Understanding the role of marine mammals in prehistoric economies and cultural evolution requires the analysis of complete faunal assemblages and a comprehensive study of the cultural and environmental context of procurement and distribution of

these animals (Colten 1993, 1994, 1995, 1998; Pletka 1996; Arnold et al. 1997; Colten and Arnold 1998).¹ In this brief summary, we present data on marine mammals from several sites on Santa Cruz and San Miguel islands, and refer to more detailed discussions of island faunal analysis and the abundant literature on the natural and cultural environment of the Northern Channel Islands.

Marine mammals are of current interest to prehistorians because they were an important and archaeologically visible resource for many Pacific Coast Native Americans. Pinnipeds, cetaceans, and sea otters were hunted for food, and their skins and bones were used as raw materials. Hildebrandt and Jones (1992) have recently suggested that marine mammal hunting was a driving force in the development of boats and cultural evolution in many western North American Native American societies. They have argued that the early inhabitants of the coasts of Oregon and California hunted fur seals, sea lions, and elephant seals ("migratory marine mammals") on the mainland coast, reducing their populations on the mainland. These animals were relatively easy to capture with simple technology because they congregated in large numbers on the shore, making them easy to kill. According to their model, the reduced populations of these animals stimulated Native Americans to develop seaworthy boats to reach offshore rocks and islands where these animals were still available, and to intensify hunting of sea otters and harbor seals ("resident marine mammals"), which were smaller in overall size, do not congregate on the shore in large numbers, and were more costly to pursue and capture. Marine mammal hunting would therefore have been an important stimulus for technological change and associated cultural developments. Our studies of faunal remains and other archaeological data from the islands demonstrate that this model is inaccurate. Marine mammals were rarely the most abundant animals in island middens (Colten 1995), the Otariidae (fur seals and sea lions) were always more

¹While this research summary includes new data, a more thorough discussion of the natural and cultural environment of our analysis is presented in Colten and Arnold 1998.

abundant than other marine mammals (Colten and Arnold 1998), and boats seem to have been developed primarily for long distance transportation of people and craft products (Arnold 1995), not for hunting marine mammals. While Hildebrandt and Jones (1992) included some data from the Santa Barbara Channel mainland in their discussion, our analysis shows those data do not support their model (Colten and Arnold 1998).

MATERIALS AND METHODS

While archaeologists have excavated sites on the islands for decades, some of the most detailed faunal data available are from four sites on the west end of Santa Cruz Island. These sites, CA-SCRI-191, CA-SCRI-192, CA-SCRI-330, and CA-SCRI-474, were large village sites and have archaeological evidence of numerous Native American houses visible on the surface. All of the sites are dense shell middens with abundant shell, bones of fish, birds, and mammals, and concentrations of artifacts. Many of these sites contain large cemeteries. The diverse array of artifacts and food remains, and the presence of architecture and cemeteries suggests relatively long term occupations. These sites span various segments of the period 500 AD through 1800 AD (Arnold 1992).

The overall faunal assemblages from these sites, as reconstructed using the bone weight method for meat weight estimates, is dominated by fish and shellfish in all time periods (Colten 1993, 1995; Colten and Arnold 1998). Marine mammals were less important, ranking third in every time period at these four sites (Table 1). Our analysis specifically shows a significant decline in the importance of marine mammals in Santa Cruz Island middens after 1150 AD. There are several independent data sets that show the period from about 1150 to 1300 AD to be a time of increased marine sea surface temperature (Pisias 1978; Arnold 1991; Arnold and Tissot 1993; Colten 1995; Pletka 1996), which may account in large measure for the decline in abundance of marine mammals. A wide body of recent research demonstrates the severe impacts of increased sea temperature on marine mammals, pinnipeds in particular (Trillmich and Ono 1991). Glassow's (1993) analysis of faunal remains from several sites on Santa Cruz Island also shows a general decline in the abundance of marine mammals through time.

Data from these four sites, and others on Santa Barbara, Santa Cruz, and San Miguel Islands, show conclusively that bones of the Otariidae (fur seals and sea lions) were always more abundant in middens than harbor seals and sea otters when calculated as numbers of identified specimens (NISP) (Table 2). Most of the San Miguel Island marine mammal data were previously reported by Phillip Walker (Walker pers. comm.; Walker and Craig 1978; Walker et al. 1978; Walker and Snethkamp 1984). While these sites also contain the remains of cetaceans and marine mammal bones too fragmented to identify to precise taxonomic categories, when all the marine mammal remains that can be classified as either migratory or resident are considered, migratory animals are most abundant in every case. This is significant because such data directly contradict the expectations of the Hildebrandt and Jones model and show that the pattern of marine mammal hunting and purportedly associated technological changes that they predicted did not occur.

The pattern of prehistoric marine mammal hunting on the Northern Channel Islands may differ from that in other areas described by Hildebrandt and Jones (1992) because the most abundant mammalian species in island middens is usually Guadalupe fur seal (*Arctocephalus townsendi*). Females of this species do not migrate over long distances when they have pups (DeLong, pers. comm. 1999), rendering the analytical categories of migratory and resident largely inappropriate for the Northern Channel Islands.

DISCUSSION

Our research shows that marine mammals were a relatively minor portion of the Native American diet, numerically and by meat weight, at four sites on western Santa Cruz Island between 500 and 1800 AD, ranking third behind fish and shellfish. The most abundant marine mammals in these sites and 11 other island sites were fur seals and sea lions. Harbor seals and sea otters were consistently less abundant than the Otariidae. The native inhabitants of the Santa Barbara Channel developed wooden plank canoes sometime after 500 AD and refined them later in prehistory, probably by about 1100 AD (Arnold 1995). Specialized craft industries on the islands increased dramatically between 1150 and 1300 AD (Arnold 1987; Arnold and Munns 1994). Evidence for regionalization of the economy and status

Table 1. General diet reconstruction from CA-SCRI-191, CA-SCRI-192, CA-SCRI-330, and CA-SCRI-474 (percent of estimated meat weight).

Time Period	Dates	Fish	Shellfish	Marine Mammal	Land Mammal	Mammal ^a	Bird
Historic	AD 1782+	60.2	25.14	5.92	0.35	6.83	1.56
Late	AD 1300-1782	62.2	23.10	9.41	0.17	4.20	0.89
Transitional	AD 1150-1300	57.2	30.17	8.29	0.26	2.85	1.24
Middle	600 BC-AD 1150	42.9	30.36	19.85	0.28	6.14	0.44

^a Undifferentiated mammal

Table 2. Migratory and resident marine mammals from fifteen Northern Channel Island archaeological sites (NISP^a and MNI^b).

Taxon	Common Name	SBI-9	SCRI-191	SCRI-192	SCRI-240	SCRI-330	SCRI-474	SNI-1	SNI-261	SNI-481	SNI-485	SNI-488	SNI-492	SNI-504	SNI-510	SNI-525b
Migratory																
<i>Arctocephalus townsendi</i>	Guadalupe fur seal	5	11	31	115	3	3	80	4	2	2	0	19	0	1	46
<i>Callorhinus ursinus</i>	Northern fur seal	0	0	0	19	1	0	0	3	0	0	0	0	0	0	4
fur seal	fur seal	1	2	2	333	19	9	183	15	16	3	0	16	0	17	0
Otariidae	eared seals	68	96	337	21	139	162	376	227	1	2	19	3	1	2	0
<i>Eumetopias jubata</i>	Steller sea lion	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
<i>Zalophus californianus</i>	California sea lion	9	1	0	32	0	0	31	8	0	0	0	0	0	0	27
sea lion	sea lion	0	0	0	0	0	0	0	0	12	4	10	46	10	2	0
<i>Mirounga</i> sp.	elephant seal	0	0	0	0	0	0	0	0	1	0	0	1	0	1	11
Resident																
<i>Phoca vitulina</i>	harbor seal	1	2	5	12	2	8	21	3	2	0	2	6	0	4	9
<i>Enhydra lutris</i>	sea otter	3	58	50	8	106	49	76	43	3	2	17	39	9	5	26
Migratory		83	110	370	520	162	174	670	257	32	11	29	85	11	23	92
Resident		4	60	55	20	108	57	97	46	5	2	19	45	9	9	35
Total		87	170	425	540	270	231	767	303	37	13	48	130	20	32	127
PERCENTAGES																
Migratory																
<i>Arctocephalus townsendi</i>	Guadalupe fur seal	5.75	6.47	7.29	21.3	1.11	1.3	10.43	1.32	5.41	15.38	0	14.62	0	3.13	36.22
<i>Callorhinus ursinus</i>	Northern fur seal	0	0	0	3.52	0.37	0	0	0.99	0	0	0	0	0	0	3.15
fur seal	fur seal	1.15	1.18	0.47	61.67	7.04	3.9	23.86	4.95	43.24	23.08	0	12.31	0	53.13	0
Otariidae	eared seals	78.16	56.47	79.29	3.89	51.48	70.13	49.02	74.92	2.7	15.38	39.58	2.31	5	6.25	0
<i>Eumetopias jubata</i>	Steller sea lion	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	3.15
<i>Zalophus californianus</i>	California sea lion	10.34	0.59	0	5.93	0	0	4.04	2.64	0	0	0	0	0	0	21.26
sea lion	sea lion	0	0	0	0	0	0	0	0	32.43	30.77	20.83	35.38	50	6.25	0
<i>Mirounga</i> sp.	elephant seal	0	0	0	0	0	0	0	0	2.7	0	0	0.77	0	3.13	8.66
Resident																
<i>Phoca vitulina</i>	harbor seal	1.15	1.18	1.18	2.22	0.74	3.46	2.74	0.99	5.41	0	4.17	4.62	0	12.5	7.09
<i>Enhydra lutris</i>	sea otter	3.45	34.12	11.76	1.48	39.26	21.21	9.91	14.19	8.11	15.38	35.42	30	45	15.63	20.47
Migratory		95.4	64.71	87.06	96.3	60	75.32	87.35	84.82	86.49	84.62	60.42	65.38	55	71.88	72.44
Resident		4.6	35.29	12.94	3.7	40	24.68	12.65	15.18	13.51	15.38	39.58	34.62	45	28.13	27.56

a NISP (number of identified specimens)

b MNI (minimum number of individuals)

differentiation first occurs at this time and does not appear to be related to marine mammal hunting (Colten and Arnold 1998). Paleoenvironmental data from several independent sources demonstrate changes in both the marine and terrestrial (Stine 1994) environment at this time, suggesting a climatic stimulus, at least in part, for the cultural changes that occurred then. The decline in the relative abundance in marine mammals through time in island middens may be a result of over-exploitation by human hunters, although the timing of the decrease suggests that environmental factors played an important role in this change in faunal exploitation.

While marine mammals were undoubtedly important to the Native American inhabitants of the islands, providing both a fat-rich resource, raw materials, and large packages of meat that might have been important for hunters' prestige, their absolute abundance compared to other fauna declined through prehistory, and fur seals and sea lions were consistently more abundant in island archaeological sites than sea otters and harbor seals. The current data show that these animals played a limited role in broader cultural developments on the Northern Channel Islands.

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